AZR AMERICAN ZINC RECYCLING
Delivering a Sustainable Future

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Electronic Mail (jeff.menzel@ncdenr.gov)

Mr. Jeff Menzel
North Carolina Department of Environmental Quality
Hazardous Waste Section
Division of Waste Management
PO Box 117
Black Mountain, NC 28711

Re: October 7, 2020 Voluntary Disclosure
American Zinc Products, LLC – Mooresboro Facility

Dear Mr. Menzel:

American Zinc Products, LLC (AZP) is providing the information below in response to your email received October 9, 2020. As noted below, while AZP is continuing its investigation of the cause of the elevated cadmium level in its gypsum product, the facility has revised its protocols for sampling, verification, and shipment of gypsum to implement additional safeguards to prevent a recurrence of the improper shipment of off-spec gypsum. AZP's responses to your request for additional information are provided below:

1. Describe the processes which generate gypsum.

During the hydrometallurgical production of zinc metal, gypsum is produced when acid raffinate bleed solution from the solvent extraction process is neutralized with limestone. This process also produces a cadmium concentrate by adding zinc dust to the solution to displace cadmium in "cementation."

2. How much is typically generated during normal operating conditions in any one month?

Depending on production level, 1,500 to 2,000 tons per week of gypsum is produced.

3. How long is gypsum typically stored on-site?

Gypsum will typically remain on the covered concrete storage pad for one to three weeks. As described in AZP's October 4, 2013 letter to the Department, AZP stores gypsum on a concrete pad with concrete dike containment. During the recent re-engineering of the facility during the long-term shutdown, a roof was constructed over this storage area to better control the moisture content of this product during storage. Gypsum is stored on the

covered concrete pad in segregated areas. Each storage area consists of a three to four-day production run of gypsum. As discussed more fully below, each multi-day production run is stored on the covered pad pending receipt of the sampling results and thereafter shipped to customers or disposed of off-site if there are no pending orders for the product. The company does not accumulate gypsum product at the site.

4. What have been the historic disposal and/or land application outlets for this material?

As stated in the October 4, 2013 letter, AZP is in the process of marketing its gypsum for commercial use in wallboard and manufacturing and for agricultural purposes. Since the facility re-start in February 2020, AZP has provided some gypsum to Carolina Gypsum for soil amendment use as a source of calcium and sulfur for plant nutrition and soil structure improvement. AZP continues to develop additional markets for this product. Recently, AZP has also sold gypsum product to Clean Harbors for use as a product re-agent for solidification of hazardous waste before the waste is placed in a landfill.

As noted in the October 4, 2013 letter, when markets cannot sustain the production volumes for gypsum, this material is disposed of in a permitted landfill. As discussed more fully below, AZP has implemented a protocol for sampling, verification, and shipment of gypsum. When the facility receives sampling results confirming the toxicity characteristic leachate procedure test (TCLP) results for hazardous metals and the content of total metals in the gypsum, AZP ships the product to customers to fill any pending orders. If any gypsum in that multi-day production run is not shipped to fill pending orders, that material is shipped to a Subtitle landfill for disposal. Currently, AZP is shipping gypsum to the following Subtitle D landfills:

- Upstate Regional Landfill (Enoree, SC)
- Waste Connections (Polkton, NC)

On the rare occasion when there is a production upset and gypsum sample results exceed TCLP metal limits, the off-spec product material has been shipped to one of the following Subtitle C landfills:

- Chemical Waste Management (Emelle, AL)
- U.S. Ecology (York, PA)
- U.S. Ecology (Canton, OH)

Once the Mooresboro facility confirmed that the sample from the September 17th through September 20th production run exceeded the TCLP limit for cadmium, the remaining off-spec product in that pile was scheduled for shipment to a Subtitle C landfill.

5. At what frequency is gypsum removed from the gypsum storage (or containment) building?

Gypsum is shipped from the facility five or six days per week, with an average of 10-15 dump trailer loads being shipped per day.

6. Is all the gypsum removed from the building when gypsum is sent for reuse or disposal?

As discussed more fully below, AZP manages its gypsum product in segregated areas on the covered storage pad. Each segregated area contains a pile containing a multi-day production run. Once the sampling results for a production run is received from the third party certified laboratory, AZP ships the gypsum to customers and/or ships any un-sold material to a landfill. Once sampling results confirm that a gypsum pile meets product specifications, all of gypsum in that pile is typically shipped out within one week.

7. What is AZR's screening or sampling protocol to ensure that contaminant levels are below LDR standards, and at what frequency per amount generated does this screening occur?

Grab samples are collected from the gypsum production line four times daily. Equal portions of the grab samples collected during a multi-day production run are combined and homogenized to make one composite sample. The composite sample for the multi-day gypsum pile is forwarded to the laboratory for analysis, including total metals and the TCLP test. One composite sample represents approximately 54 to 71 tons of gypsum produced depending on the rate of production. Composite samples are sent to an outside laboratory for TCLP RCRA-8 metals analysis twice per week.

Prior to receiving analytical results from the laboratory, the gypsum pile is maintained in a segregated area with signage identifying the production dates, the date the composite sample was forwarded to the laboratory, and that the gypsum is being held pending the sampling results. Once results are received from the laboratory information is changed on the signage for a pile from "hold" to the designated destination(s) for shipment. Operations is notified of the shipping destination and the designated trucks for loading and transport of the material.

8. Can AZR identify the cause of the exceedance and what measures are being taken to ensure that this issue is not ongoing? Especially if there are any reengineered processes or waste routing procedures that have been implemented in the last few months.

AZP is still investigating the cause of the excursion as to the upset condition which led to the elevated cadmium content in gypsum produced in the September 17th-20th production run. Since the discovery of these circumstances, AZP is exploring alternative means of monitoring the content of metals in the circuit from which gypsum is produced, so that based on process monitoring results necessary adjustments can be made in the production

process to prevent these circumstances from occurring in the future. AZP's process improvement efforts continue in this area, so that controls can be established to ensure that quality gypsum product is produced for beneficial use.

With respect to gypsum management related to coordination of sampling and analysis, verification of analytical results, and internal authorization of shipments based on analytical results, AZP has made revisions to the protocols governing these areas, and will make additional revisions as warranted by additional information gathered from the ongoing investigation. We are working with the landfill to ensure they are advised of analytical results in advance of receiving shipments from an associated gypsum pile.

Specifically, the authority to release gypsum from a particular pile / production run for shipment to customers or a landfill has been delegated to the facility's environmental manager. Additionally, the facility environmental manager will provide TCLP results for any un-sold product to the Subtitle D landfill prior to shipment of the gypsum to that landfill.

Finally, AZP will re-train employees involved in the management of the gypsum product on the revised protocols.

Please feel free to contact me if you need additional information regarding AZP's management of gypsum at the Mooresboro facility.

Sincerely,

Timothy R. Basilone